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Exercise - Getting Started Part II

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The goals of exercise are:

1. Increase your aerobic capacity
2. Increase your lean body mass
3. Increase your Basal Metabolism Rate (BMR)

Aerobic exercise increases your body, and particularly your heart's, ability to use oxygen. Actually, your aerobic capacity can be measured with cardiopulmonary exercise testing (CPET) such as that done in Southeast Texas Medical Associates' cardiopulmonary laboratory. There are two concepts which will help you if you are serious about an exercise program which will significantly improve your health. One is **VO₂Max** and the other is **anaerobic threshold**. They are complex concepts but not difficult if you give a few minutes to think about them.

Aerobic Capacity

Aerobic capacity is defined in terms of your VO₂Max (read as V dot O₂ Max), which is defined as "the maximum amount of oxygen you can take in and utilize measured in milliliters per kilogram per minute.

Here is the principle: as exercise intensity increases so does your uptake of oxygen. For example, the faster you run, the more oxygen you must consume to sustain the pace. There comes a point where your body simply cannot increase the amount of oxygen it consumes and utilizes, despite an increase in exercise intensity. This is your VO₂max.

Imagine your VO₂Max as your "aerobic ceiling". If exercise intensity increases after you have reached your VO₂Max, your body must use predominantly anaerobic (without oxygen) pathways for energy production. The result? Lactic acid begins to accumulate rapidly. You can only continue exercising at that level for a few minutes at most.

Can you change your "aerobic ceiling?" Yes. There are 6 major factors that affect your aerobic power.

1. Genetics -- Genetics is said to play a 20-30% role in VO₂Max.
2. Your age -- After the age of 25 VO₂Max decreases by 1% a year. The good news is regular physical activity throughout life can offset much of the decline.
3. Training status -- Athletic training can alter a person's VO₂Max as much as 20% depending on their lifestyle and fitness habits.
4. Exercise mode -- Measure an athlete's VO₂Max on a treadmill test, then a cycle test

and finally in a swimming pool and the results will all differ significantly. Treadmill running has been shown to produce the highest values.

5. Your gender -- Women generally have VO_2Max values that are 15-30% lower than men's. This takes into account differences in bodyweight. With a straight, like-for-like comparison the difference is even greater.

6. Your body composition -- Much of the differences in VO_2max between men and women is attributed to body composition. Although there are other biologic differences between the sexes, research suggests VO_2Max decreases as body fat percent increases.

Can you improve your VO_2Max ? With athletic training, aerobic power can improve 6-20%. However, the larger gains usually come from untrained, sedentary individuals. If you are a regular exerciser, and particularly if you consider yourself to be an endurance athlete, chances are endurance training will only make small improvements in your VO_2Max .

Anaerobic Threshold

Knowing your VO_2Max alone is useful. But it's far more useful if you know and understand your lactate or anaerobic threshold as well. Understanding anaerobic threshold help you understand why training is important. If your VO_2Max is your aerobic potential, your anaerobic threshold determines how much of that potential you tap. More importantly you can improve your lactate threshold considerably with athletic training.

Here's a quick recap of VO_2Max . VO_2Max is the point at which your body cannot increase its intake of oxygen despite an increase in exercise intensity. Exercise beyond this point has to be anaerobic (without oxygen). The result: high levels of blood lactate that puts a halt to your progress. Does that mean then if you exercise at intensity below your VO_2Max you'll be able to continue indefinitely? Not really. For most people debilitating blood lactate starts to accumulate at exercise intensity much lower than at VO_2max . At rest and during gentle exercise the body still produces lactate, however it can remove it just as quickly. Hence no lactate builds up.

As the exercise intensity increases and anaerobic pathways are called upon more and more, the body struggles to remove lactate as quickly as it's produced. Hence blood lactate begins to accumulate. **The point at which this occurs is called your anaerobic threshold.**

Just like VO_2Max , anaerobic threshold occurs at different exercise intensities for different people. It is expressed as a percentage of your VO_2Max . Once the cardiopulmonary exercise test has determined the heart rate which corresponds to your anaerobic threshold, you can start to design athletic training sessions to improve it.

Anaerobic Threshold Training

Anaerobic threshold training is relatively straight forward once you have established your target heart rate zone. The intensity of training sessions should be at, or just below, your anaerobic threshold.

Anaerobic threshold training sessions can take the form of either interval or continuous training. Interval training should consist of three to five, 6-12 minute intervals. The rest period between intervals should be 2-3 minutes. Ideally you would reach your target heart rate as quickly as possible -- inside a minute.

A typical anaerobic threshold training session for a cyclist might be as follows.

Interval Training Session	
Frequency	2x week
Intensity	95-100% ATHR*
No. intervals	5
Interval time	10mins
Rest intervals	3mins

* ATHR = Anaerobic Threshold Heart Rate

A continuous training session to improve anaerobic threshold should last for 20-45 minutes. This is more demanding than the interval session so it should be built up to gradually.

Interval Training Session	
Frequency	2x week
Intensity	95-100%ATHR
Time	20-45mins

Anaerobic threshold is more reliable indicator of your performance than V.O₂max. More importantly, anaerobic threshold is generally more responsive to training, especially if you are regularly active.

The benefits of aerobic exercise

- A more efficient heart. A stronger heart can pump more blood for every heartbeat. Therefore, your heart doesn't need to beat as fast during rest or exercise. Having such a strong heart helps you live a longer, healthier life.
- Weight loss. Combined with a healthy diet and appropriate strength training, aerobic exercise will help you lose weight.
- Improved mental health. Regular aerobic exercise releases endorphins, your body's natural painkillers. Endorphins also reduce stress, depression and anxiety.
- Improved immune system. People who exercise regularly are less susceptible to minor viral illnesses, such as colds and flu. This may be because aerobic exercise helps activate your immune system and prepare it to fight off infection.
- Increased stamina. Exercise may make you tired in the short term, during and right after the activity, but over the long term it will increase your stamina and reduce

fatigue.

- Disease reduction. Extra weight is a contributing factor to conditions such as heart disease, high blood pressure, stroke, diabetes and some forms of cancer. As you lose weight, your risk of developing these diseases decreases. In addition, weight-bearing aerobic exercise, such as walking, can reduce your risk of osteoporosis and its complications. Low-impact aerobic exercises, such as swimming, cycling and pool exercises, can help keep you fit if you have arthritis, without putting excessive stress on your joints.
- Increased life span. In 1986, results from the Harvard Alumni Health Study published in the *New England Journal of Medicine* for the first time scientifically linked exercise with increased life spans. Since then, additional research has supported this finding.
- Improved muscle health. Aerobic exercise stimulates the growth of tiny blood vessels (capillaries) in your muscles. This helps your body more efficiently deliver oxygen to your muscles and remove from them irritating metabolic waste products, such as lactic acid. This can lessen your pain if you have chronic muscle pain, fibromyalgia or chronic low back pain.

Regular conditioning exercises, including weight training, will:

1. Decrease your body fat – once your body fat % falls below 25 for a female and 20 for a male, weight is eliminated as a risk factor for any known disease.
2. Increase your lean body mass – this will increase the percent of total body water which makes all of the cells in your body work better and more efficiently.
3. Increase your Basal Metabolism Rate – this will allow you to eat more without gaining weight.
4. Decrease your probability of injury from falls and other trauma.
5. Increase your self esteem.
6. Increase your mobility allowing you to enjoy the things which bring you pleasure.
7. Decrease the aging processes which we assume are “normal” but which are often just the consequences of our wrong choices.

Next week, specifics on get starting. Remember, it is your life and it is your health.